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Title: Improving uptake of hepatitis B and hepatitis C testing in South Asian migrants in community and faith settings using educational interventions - a prospective descriptive study

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Abbreviations:

CVH: Chronic viral hepatitis

SA: South Asian

WHO: World Health Organization

NICE: National Institute for Health and Care Excellence

RCT: Randomized controlled trial

DBS: dried blood-spot

HBsAg: Hepatitis B surface antigen

HBcAb: Hepatitis B core antibody

HCV: Hepatitis C

HBV: Hepatitis B

ABSTRACT

Background: Chronic viral hepatitis (CVH) is a leading contributor to the UK liver disease epidemic, with global migration from high-prevalence areas (e.g. South Asia-SA). Despite international guidance for testing high-risk groups in line with elimination targets, there is no consensus on how to achieve this.

Objectives: (i) Feasibility of recruiting SA migrants to view an educational film on CVH (ii) Effectiveness of the film in promoting testing, knowledge of CVH (iii) Methodological issues relevant to scale-up to randomized trial.

Methods: We recruited SA migrants to view the film (intervention) in community venues (primary care, religious, community), offering dried-blood spot CVH testing immediately afterwards. Pre/post-film questionnaires assessed the interventions effectiveness.

Results: Two hundred and nineteen first generation migrants >18yrs (53% female) were recruited to view the film; 184 (84%) underwent CVH testing (HBc Ab or HCV Ab positive, demonstrating exposure in 8.5%) at the following sites: n=112 (51%) religious, n=98(45%) community, and primary care, n=9 (4%). Pre (n=173, 79%) and post (n=154, 70%) intervention questionnaires were completed.

Conclusions: We demonstrate the feasibility of recruiting first generation migrants to participate in a community-based educational film, promoting CVH testing in this higher-risk group, confirming value of developing interventions to facilitate global WHO plan for targeted case finding, elimination and future randomized controlled trial. We highlight the importance of culturally relevant interventions including faith, and culturally sensitive settings appearing to minimize logistical issues effective at engaging minority groups and allowing ease of access to individuals ‘at risk’

Improving uptake of hepatitis B and hepatitis C testing in South Asian migrants in community and faith settings using educational interventions - a prospective descriptive study

Introduction

The UK faces an ever growing burden of chronic liver disease and its sequelae at a time of significant improvements in the morbidity and mortality of other chronic diseases [1]. A significant contributor to this is chronic viral hepatitis (CVH), a leading cause of liver disease worldwide [2]. National and international guidance stress the importance of efforts to close the CVH prevalence gap, through case-finding and ultimately treatment. This will minimize the burden of liver disease and its complications, as well as reducing onward transmission of CVH in keeping with the World Health Organization (WHO) call for elimination of CVH as a public health problem by 2030 [3]. CVH tends to be most prevalent amongst groups who traditionally experience barriers to healthcare e.g. prisoners, drug users and migrants. Therefore, targeted interventions are required to increase confidence and testing amongst these groups with the ultimate aim to reduce inequalities in treatment and disease burden for these high risk groups.

Despite this impetus to case-find, it is unclear whether interventions are effective in achieving this goal. The rate of CVH infection amongst migrants is higher than the background UK population and is believed to be related to the prevalence in the country of origin [4]. Migrant populations experience poorer health and barriers to accessing services both in the UK [5] and internationally [6], with communication and cultural differences likely contributors to the increased morbidity and mortality seen in minority ethnic groups with CVH [7].

In the UK, the National Institute for Health and Care Excellence (NICE) and NHS England (NHSE) advocate promoting testing in higher-risk groups, such as migrants from moderate to

high prevalence areas (e.g. South Asian countries) [2]. NICE recommend community based interventions, however no guidance is given on how to target at risk populations [2]. There is, therefore, a need to develop tailored interventions to promote case finding in higher-risk groups who traditionally experience barriers to healthcare access e.g. prisoners, drug users and migrants, increase confidence and testing amongst these groups, with the ultimate aim to reduce inequalities in treatment/disease burden for these groups.

The evidence base for case-finding healthcare interventions is centered around population based screening programs [8]. Whilst evidence exists on factors influencing an individual's likelihood of screening uptake, the literature is less conclusive over the effectiveness of different intervention types, being limited by heterogeneity of data collection and analysis [8,9]. However, culturally relevant interventions including the importance of faith, language and culturally sensitive settings and those that minimize logistical issues may be more effective at engaging minority groups [9]. We have developed a short, culturally and linguistically tailored educational film based on qualitative data collected, surrounding the knowledge, perceptions, barriers and fears of CVH infection and testing in South-Asian populations [10,11]. In this paper we report on the feasibility of recruiting members of South-Asian communities in England to view the film, and subsequently accept CVH screening.

At the time of writing, we did not identify evidence surrounding the use of an educational film in promoting case-finding in CVH.

Materials and Methods

Our aims were to

1. Determine the feasibility of recruiting South-Asian migrants residing in South-East England to view a short educational film based on qualitative data collected from our previous study[10, 11]
2. Determine the effect of this educational intervention on the (i) uptake of CVH testing in community settings (ii) understanding of viral hepatitis
3. Identify methodological issues which may compromise the acceptability and feasibility of a definitive randomized controlled trial (RCT) of this intervention

Study design (figure 1)

Development of the Film Intervention

We used qualitative data to inform the development of a short (12 minute) film to explain CVH, modes of transmission and how to access testing (<https://youtu.be/K3AYyZ3uHro> (English) and <https://youtu.be/dapPV4oul9s> (Urdu with English subtitles)). We undertook eight focus groups with men (n=26) and women (n=27) from South-Asian communities to understand their knowledge and views on CVH and the role of community based testing. Thematic analysis led to the generation of key areas to address in the film [10, 11].

Participants stressed the importance of personal stories from the community, therefore the film included testimonies of first-generation South-Asian migrants with experience of testing for CVH, including those who tested negative and those previously treated. The film was

produced by a professional film-maker with experience in directing and producing educational healthcare films [12]. The content and style were edited with input from stakeholders and thereafter piloted within the target community to ensure understanding and suitability of language (spoken Urdu with English subtitles). Urdu was chosen because it was the language used by many of the local SA community. The subtitles were also available in other SA languages as required.

Recruitment and Film screening

Participants were recruited to view the educational film in community settings from February to June 2018 (religious venues, community centers and primary care facilities) in South-East England. Initially, recruitment was centered around Surrey, however, due to concerns about potential contamination of study sites within this area, i.e. participants visiting different study sites, recruitment was widened to other centers in Greater London, including Hounslow, Wandsworth and Merton. Seventeen film screenings occurred in fourteen different venues including four primary care, four community and six religious venues. The community venues were a mixture of existing social groups based on ethnicity (mixed gender and religion) and support groups for education and language lessons for new female migrants. The religious venues were all Mosques. The film was shown twice in two of the religious venues (once for each gender) and twice in the same community setting due to the increased interest from the community.

Critically, guidance on recruitment was provided through the help and support of community stakeholders e.g. community advocates e.g. primary care doctors, community nurses and pharmacists and community champions e.g. faith leaders, councilors. Initial contact from multilingual members of the research team was made with each target site (e.g. faith leader

leader) to explain the nature of the study. When agreement to participate with sites was reached, the research team visited again, outlining the project aims and developing community links. Participant information sheets were delivered and a suitable area to show the film identified. Two weeks prior to the date of scheduled film screening, an advertising campaign in conjunction with community leaders was carried out with multilingual posters advertising a health educational event. Further advertising depended on the type of venue:

- a. Religious: Religious leader announced the event at key attendance times, e.g. main prayers
- b. Community: Community center organizer announced a planned health education event to regular attendees
- c. Primary care: Healthcare staff identified patients from the target population and distributed participant information sheets, research team contacts and date of film screening.

The film was shown in group sessions with variable attendance (n=1-80). We did not set a lower limit of attendance as it was felt inappropriate to cancel events as this could diminish trust in the research team.

Inclusion/exclusion criteria:

Inclusion criteria for this study were: first generation migrants self-identifying as South Asian, aged 18 years or over, able to give informed consent and communicate in English, Urdu or Hindi. The Ethics approval process highlighted we were providing healthcare education and accordingly, no one should be excluded from viewing the film. Those not meeting study inclusion criteria were able to view the film but not recruited to provide research data.

Post-film CVH testing and linkage to care:

Immediately after the film screening, participants were offered CVH testing. A return visit to the venue was scheduled for a week later if the number requiring testing was not manageable on the day or if participants wanted more time to consider testing.

Consent for CVH testing was received separately and privately by a research clinician. As this study was community-based, we used finger-prick testing with dried blood-spot (DBS) kits for CVH testing (Abbott). This tests for Hepatitis B surface antigen (HBsAg), Hepatitis B core antibody (HBcAb), Hepatitis C (HCV) antibody (and reflex HCV RNA testing if antibody positive), and has a high sensitivity and specificity [13]. Each sample was tested in an accredited NHS laboratory, with results available within 7-10 days. Procedures for referral to health care services for treatment for a positive blood borne virus test were agreed in advance of testing.

Pre- and post-film questionnaires (see appendix):

To assess the effectiveness of the film, and to determine knowledge pre- and post-film, questionnaires were distributed to those who viewed the film. Questionnaires were designed using a combination of externally validated existing questions, and those designed for this study including knowledge of CVH, prior experience, utility of the film and intention to test. Answers were provided on a five point Likert scale, from strongly disagree to strongly agree.

Statistical analysis

The target sample size of 200 was derived to provide an estimate of the proportion seeking testing following the intervention, with suitable precision, and provides for a half-width of a 95% confidence interval for this proportion in the region of 6-7% over a wide range (20-80%) of possible values for this proportion. Due to the feasibility nature of this study, results

are reported as descriptive statistics. Participant characteristics are presented as percentages for categorical variables. Two-sided 95% confidence intervals, where applicable, were calculated using StataIC 15.1 (Statacorp LP, College Station, TX).

Study success criteria

These included a. 40% (n=80) of participants watching the film will be tested. Previous pilot work demonstrated 15-20% uptake of testing without an intervention in a community setting [14]; b. 90% of participants viewing the intervention will complete the pre-film questionnaire and c. 80% of participants will complete the post-film questionnaire

This study received regulatory approval from the National Health Service Health Research Authority (17/LO/0881).

Results

Two hundred and twenty-one participants were recruited to view our educational film, across fourteen different venues from February to June 2018. Two participants were excluded as they were not first generation migrants. Therefore, two hundred and nineteen were included in the study (see figure 2). The majority were recruited from religious (n=112; 51%) or community settings (n=98;45%), and a minority from primary care (n=9; 4%).

General characteristics:

Demographic details were collected for study participants and are illustrated in table 1. The demographic details of those subsequently testing for CVH are shown in figure 3. Testing for CVH One hundred and eighty-four of the two hundred and nineteen (84%) participants tested

for CVH after viewing our film (figure 2). The overall proportion of participants testing for CVH was similar across all types of site, as shown in figure 4.

Results of pre- and post-intervention questionnaires:

Of the two hundred and nineteen who viewed the film, 79% (n=173) completed the pre-intervention questionnaire with 70% (n=154) completing the post-intervention questionnaire, which was less than predicted.

A questionnaire was judged complete if any question was answered. However, many of the questionnaires had missing data points. Data was available for 65% (n=142) who filled in both questionnaires. This overall sample is skewed, with 82% (n=117 of responses) completed by those who tested; in keeping with the majority of participants who viewed the film also requested CVH testing. When reviewed by testing status, 64% of those who accepted testing and 66% of those who did not, completed both questionnaires. When asked if this film was useful, 86.6% (n=123) agreed or strongly agreed. There was no difference between tested and non-tested groups (86%; 88%). One person disagreed the film was useful (0.7%), but did undergo testing. The remainder (n=18, 12.7%) did not answer the question. Again, this was similar for those who did and did not test for CVH (13%; 12% respectively). Participants were asked to rate their confidence in understanding CVH. One hundred twenty participants responded (85%), with a similar proportion responding from tested and non-tested groups. Knowledge was unchanged pre- and post-film in 31% (n=37). The majority of those reporting their knowledge was unchanged (n=21) were confident both before and after the film, a small number were not confident in their knowledge (n=6) and a further small number neither agreed nor disagreed (n=10). Knowledge improved (from either neutral/not confident to confident) post film in 58% (n=70). There appeared to be a trend towards

improved knowledge post-film in the non-tested group (n=16; 64%) compared with tested (n=54; 46%). A small number reported a fall in confidence (from confident to not confident or neutral) in their knowledge (n=13; 11%). Prior experience of CVH was assessed as a possible confounding factor in testing; however, around one-third of respondents did not provide an answer. Few patients had any personal experience of CVH (n=8; 7% in the tested group and n=1; 4% in the non-tested group). There was some experience in a family member (n=34; 29% and n=5; 20% in the tested and non-tested groups respectively). However, 32% (n=77) and 44% (n=11) reported no experience of CVH in the tested and non-tested groups respectively.

Word of mouth testing uptake:

During a pre-arranged repeat visit at both a community and religious venue to test participants, members of the community who had not seen our film requested testing (n=31 and n=14 respectively table 1b, figure 5). A clinician discussed this with each individual and obtained written informed consent prior to testing. All participants who approached us in this manner consented to testing, and mentioned their awareness of our community work and the film specifically. Anecdotally, they were informed about the nature of CVH and its transmission, stating they had obtained this information from others who viewed the film.

Results of CVH testing:

Of the two hundred and twenty-nine tested, (n=184 having viewed the film and n=45 testing through word of mouth), eighteen required a repeat test as the original result was inconclusive (equivocal result, smaller sample size affecting sensitivity of the test) but opted

not to have this done. These 18 participants were excluded from further analysis. Eighteen (8.5%) participants of the 211 tested with valid results had exposure to CVH (see figure 6). There were no infections detected in primary care patients. There were no HCV exposures in the community venues. There were, however, five cases of previous HBV exposure (HBcAb) and one active (HBsAg positive) HBV infection. The three patients with HCV exposure were discovered in religious venues, including one active infection with seven HBV exposures, and one active HBV infection.

Discussion

The South-Asian migrant population in the U.K. represent a higher-risk group that are often unaware of their CVH risk. We found it feasible to reach the target audience and recruit individuals from South-Asian groups to view a short educational film on CVH in community venues, with subsequent uptake of CVH testing and treatment if required. This study satisfied the major pre-defined criteria for success; 84% versus 40% of participants watching the film being tested. Whilst there did not appear to be any relationship between film venue, gender, country of origin or level of education and decision-to-test, age appeared linked. Our cohort was skewed towards relatively older participants and while testing uptake appeared lower in younger people (57% [95% CI 18-90%] for 18-24 year olds), the small numbers viewing the film in this age range (n=8) precludes robust statistical inference. A particular success of our work was in the recruiting of (i) the older age group and (ii) females (53%) to film screening, as well as testing for CVH as females are often underrepresented in prior studies [15], and likely due to holding events in culturally sensitive settings. We did find recruitment of females was more effective in community groups rather than religious settings. It may be that these pre-existing community groups gathered at a time during the day when children were at

school and so there was more time to discuss this work. We found during our attendance at religious venues women were time pressured in their role as carer to children and other family members.

Additionally, the study targeted inner city areas that were relatively deprived as well as more affluent areas of South-East England and we did not find any difference in ability to recruit to view the film nor testing for CVH. Notably, a number of participants (n=45) requested testing for CVH without having seen the intervention. This may suggest other factors including community endorsement may be relevant in testing. Anecdotally, these participants had an understanding of the risk factors for CVH and had knowledge of the wider work we had been undertaking in the community, suggesting that other forms of public interest messages have been successful e.g. providing test facilities at the same time increases uptake is impactful and achieves the objective of the educational program. Whilst possible the offer to test was taken up independently of the film, our experience suggests that word-of-mouth spread of information in this community appears critical.

We identified finger-prick DBS testing as appropriate for the study, considering the community setting. However, results of these tests were not available immediately and required further contact with the participants to inform them of the results. A point-of-care test with immediate results could lessen the time and logistical burden of this type of outreach work, particularly given the nature of case-finding work in CVH requires mass testing. This may also allow a one-stop clinic where transient elastography, blood borne virus testing and onward treatment could be possible. However, careful consideration to maintaining confidentiality in the community setting would be essential.

Considerations for a scale up and future RCT will be driven by those who will use this film locally and nationally. This will require engagement with key local and national Public Health agencies such as Public Health England, the National Screening Committee and Primary Care organizations as well as the Hepatology community, faith leaders, community organizations and the third-sector to deliver this sustainably. The advantage of this work is that the film intervention is now made. Therefore, for a full RCT we would have costs relating to technology (use of a laptop, projector and speaker system) to demonstrate the film in the community. These items were purchased as part of this study. For a wider roll out we would anticipate a further two set ups available to allow sessions to run at different sites. The costs for our feasibility work were related primarily to Staff costs which included a research assistant with knowledge of the community and languages. We propose to use a community based knowledge champion e.g. local councilor or faith group leader e.g. imam or alternatively knowledge advocate e.g. community pharmacist who will require initial training and ongoing salary costs but would aim to develop this role within existing operational delivery networks for Hepatitis C. The educational campaign would have to be modified to provide details on the number of people exposed and so exact costings are currently being determined.

Whilst recognizing the feasibility nature of this study, we note limitations which are important to consider for a future RCT to test the efficacy of the intervention (see Table 2). Firstly, primary care recruitment was predictably poor which underlines the need for community setting and less medical environment, identification of reasons for this would improve this dataset further, particularly in light of other studies recent success in this area [16]. A possible factor was that patients were informed of the educational event when attending an appointment with their healthcare provider and so may have had other health

concerns at the time. A systematic method of identifying our target population such as health records search would allow us to reach more participants. Secondly, many of our participants were from older age groups (aged 61+) reflecting recruitment from community centers usually frequented by retired people. Film screenings were also held in the evenings and at weekends to try to balance this effect, and whilst we did recruit smaller numbers across other age ranges, our population remains skewed towards older participants and so our results may not be as applicable across other age groups. It is conceivable that younger migrants may be less likely to visit religious venues [17]. Thirdly, we were unable to establish a denominator for recruitment to assess how many participants opted to attend the film screening upon exposure to the advertising campaign. The nature of this study was to advertise to existing groups of people utilizing the recruitment venues, thus it was not possible to specifically assess those individuals who may have heard of this work but decided not to attend the event. In part, we believe this was related to the feasibility nature of this work and we have plans to address this in scale-up to an RCT. Completion of the pre and post-film questionnaires was inconsistent and did not meet the threshold we had set for success for this study. Future studies could be streamlined through registration (pre or on site) – access to records minimizes the time spent and help information back to primary care in real time.

Despite limitations, this study has significant findings that warrant further assessment in a scaled up randomized trial. Whilst there is some data on case-finding in higher-risk minority groups these have mainly focused on offering a single opportunistic testing of those already engaged with healthcare services [18]. The UK hospitals working within the context of operational delivery networks (ODN) have been tasked from moving from a traditional treatment role in HCV management only to also a case finding role which has traditionally fallen to public health. The importance of community based approach must not be

underestimated and a need to validated tools to support hospitals to deliver this function and meet operational targets around treatment of cases.

This study utilized the community itself to develop an educational intervention that provides information to the community on risk factors for CVH acquisition as well as offering advice on obtaining testing. This will help address reinfection and onwards transmission of CVH. As vertical infection is important in CVH acquisition our success in recruiting females was particularly important. Given the intervention we designed is culturally and linguistically tailored to the South-Asian community we hope this film could ultimately be widely available e.g. antenatal clinics in areas of high South-Asian populations, if proven effective in a randomized trial to raise awareness of CVH and its transmission. To the best of our knowledge there are no other studies examining the use of a film to provide education as well as offering testing. This method, once fully evaluated in an RCT, should be particularly useful in the real-world with the ready availability of technology such as social media and file sharing sites.

Our study successfully addressed NICE and NHS England aims of offering testing, and indeed treatment, in areas familiar to the migrant community and we hope this model of healthcare engagement could help to address some of the barriers to healthcare more generally migrant communities face.

We tested higher-risk first generation migrants (South-Asian) groups for CVH, detected positive cases and subsequently linking patients successfully to care. This linkage to care is a fundamental factor in any intervention to improve testing rates for CVH and we recommend robust plans are made for this in the design of any study of this type. Equally, we believe it is

important to test comprehensively for viral hepatitis including previous HBV exposure, particularly as modern healthcare is increasingly utilizing therapeutic agents that carry a risk of HBV reactivation and we counselled our patients on this risk and informed their primary care physician.

The mode of transmission of infection of HBV and HCV associated with CVH is similar but approaches to their prevention and treatment is different. With respect to HBV the availability of an effective vaccine and access to antiviral therapy offer a realistic chance to treat and prevent CVH and liver cancer. In contrast, there is no specific vaccine to HCV but availability of effective antiviral agents and recent advances in therapies are a welcome opportunity to control this infection and prevent chronic infection and liver cancer. Among other benefits, this study confirms the feasibility of adopting a strategy to '*find, prevent and treat*' CVH and reduce the global burden of liver cancer. Furthermore, this study has shown that it is feasible to apply this approach may be extended to undertake opportunistic screening or testing for other infections to address specific health inequalities, as appropriate.

We believe that the benefits of this study are three-fold. Firstly, offering CVH testing and thus potential diagnosis and treatment to a higher-risk group; secondly, providing education to be shared more widely within the community and finally engagement of a higher-risk group with community based healthcare. Overall, we found a higher than anticipated uptake of testing for CVH after viewing the educational film, however, the feasibility nature of this study limits its ability to prove causation between the intervention and subsequent testing.

The effectiveness of this study in promoting CVH testing has led to plans for an RCT to further evaluate this intervention. If successful, this could be the basis of a model to be utilized nationally and internationally in keeping with the emphasis on targeted case-finding, in line with the WHO plan for global CVH elimination. Whilst the study focused on CVH, it

provides a model for general health education and screening for a wider range of conditions, point prevalence or enhanced surveillance studies

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Contributions

Claire Kelly: Study Design, draft manuscript and editing, data collection and analysis

Marinos Pericleous: Data collection and analysis, editing and drafting manuscript

Ayesha Ahmed: Study Design, draft manuscript and editing, data collection and analysis

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Margot Nicholls: Manuscript editing

Charles Gore: Study design and manuscript editing

Simon de Lusignan: Study design and manuscript editing

Aftab Ala: Chief Investigator, overall concept and guarantor of the study development and delivery, study design, manuscript writing and editing.

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Ethics Approval

This study received regulatory approval from the National Health Service Health Research Authority (17/LO/0881).

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Figures:

Figure 1: *Summary of the structure of this study*

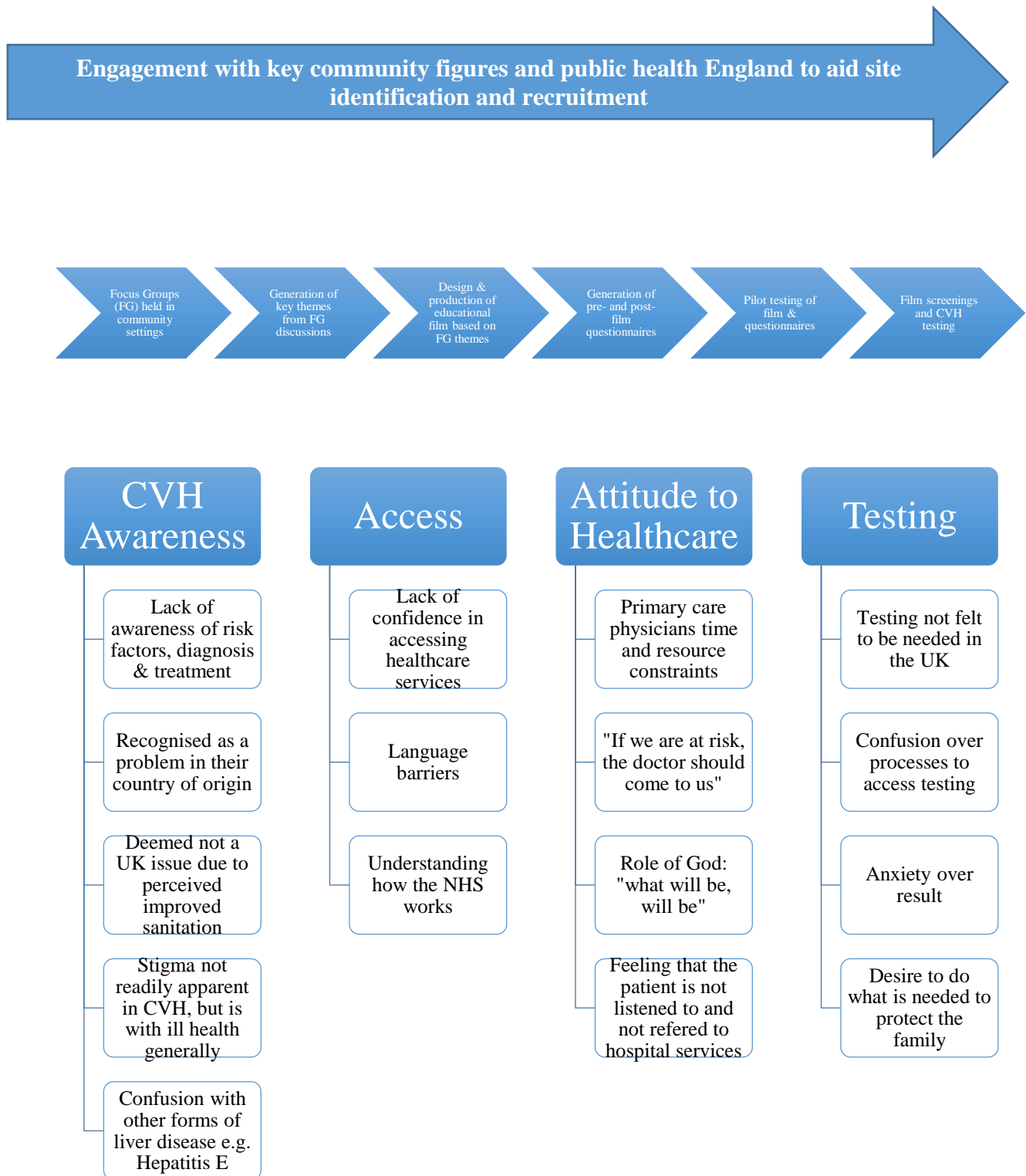


Figure 2: *Total number recruited to view the educational film*

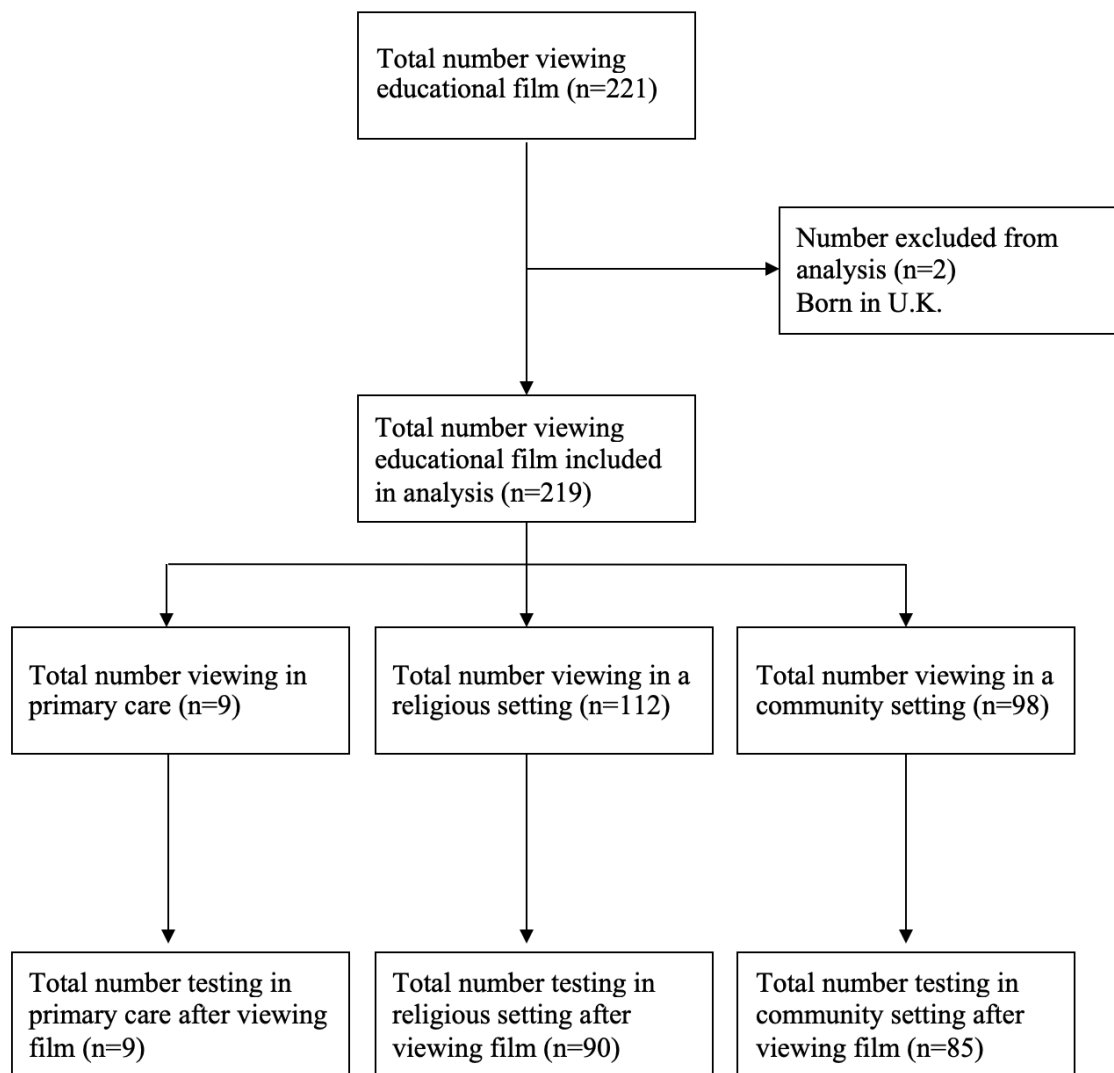
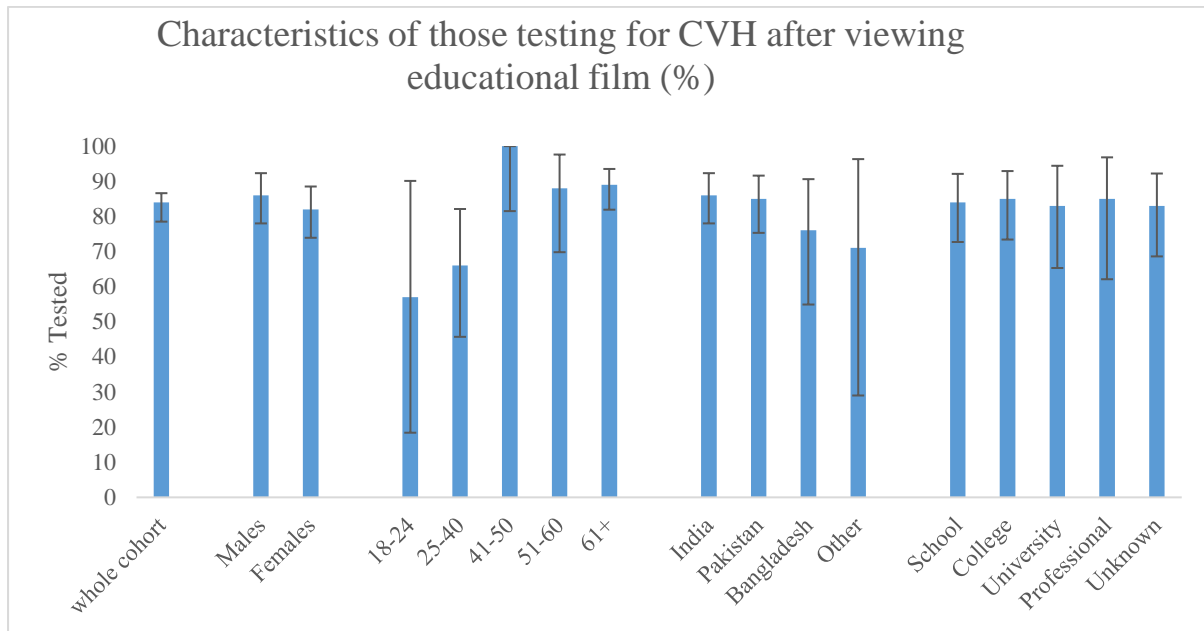


Figure 3: Characteristics of those testing for CVH after viewing the film, including percentage tested by gender, age, country of origin and educational attainment. 95% 2 sided confidence intervals are shown



*Figure 4: Testing for CVH by site, including 2 sided 95% confidence interval *97.5% one-sided confidence interval*

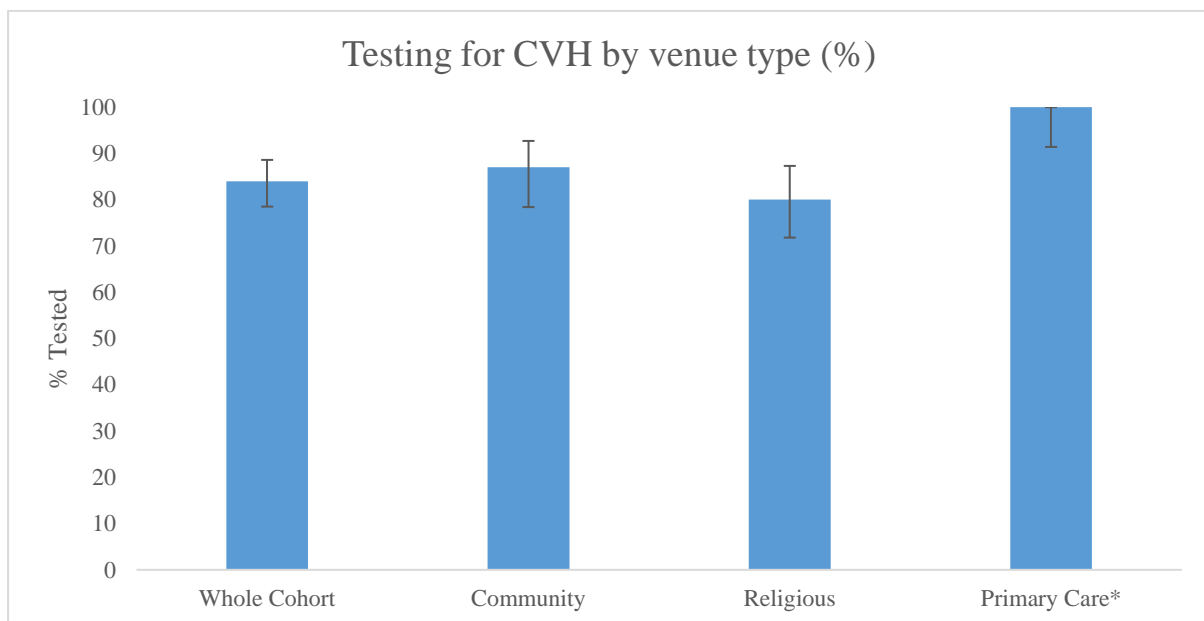


Figure 5: Number of participants testing by venue type including those testing through word of mouth

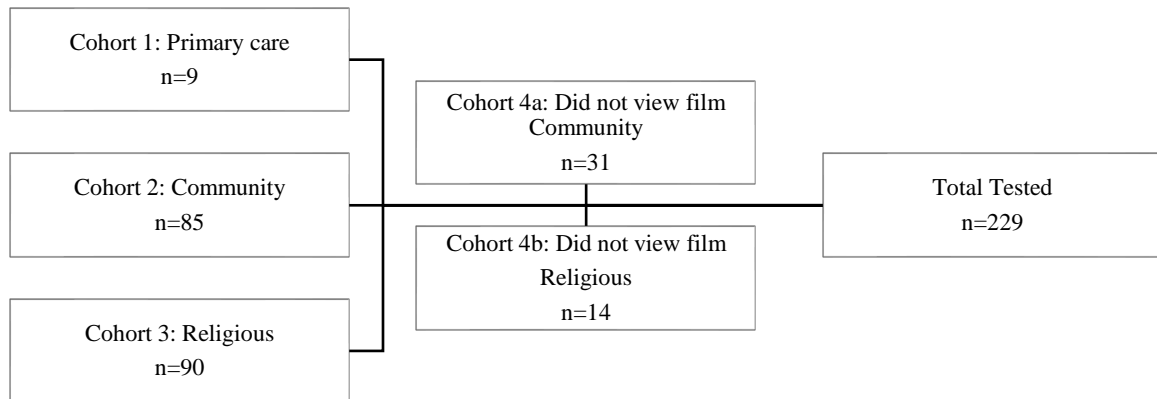
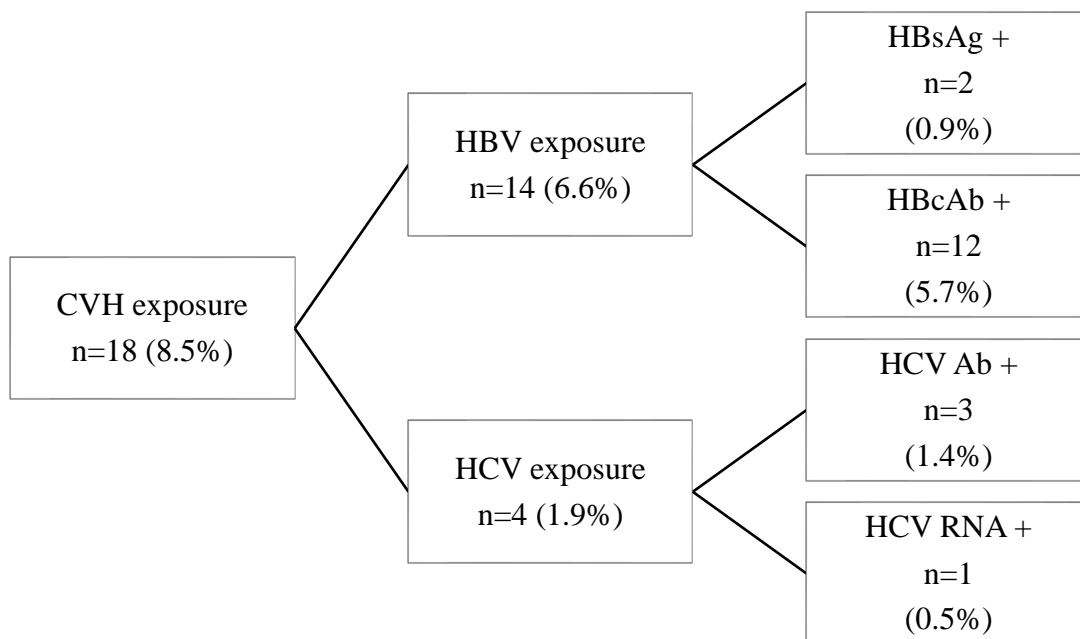


Figure 6: Exposure to CVH detected with percentage of the overall tested cohort shown



Tables:

Table 1a: Demographic details of those recruited to view the educational film by venue type

	Community Recruitment n=	Religious Recruitment n=	Primary Care Recruitment n=	Total Recruitment n=	Total Recruitment %
	Gender				
Males	23	74	5	102	47%
Females	75	38	4	117	53%
	Age				
18-24	-	7	-	8	4%
25-40	1	24	4	29	13%
41-50	1	16	1	18	8%
51-60	8	17	2	27	12%
61+	87	45	2	133	61%
unknown^	1	3	-	4	2%
	Country of Origin				
India	84	17	1	102	47%
Pakistan	3	74	8	85	39%
Bangladesh	6	19	-	25	11%
Other South Asian	5	2	-	7	3%
	Highest Educational Attainment				
School	34	29	-	63	29%
College	20	38	2	60	27%
University	10	16	4	30	14%
Professional	11	6	3	20	9%
Unknown	23	23	-	46	21%

Table 1b: Demographic details of those recruited for testing alone through word of mouth in the community

DEMOGRAPHIC	TESTED (N=)	DEMOGRAPHIC	TESTED (N=)
Religious		Community	
Whole Cohort	14	Whole Cohort	31
	Gender		
males	12	males	17
females	2	females	14
	Age		
18-24	2	18-24	0
25-40	1	25-40	0
41-50	2	41-50	3
51-60	3	51-60	1
61+	6	61+	27

Table 2: Specific areas of concern and proposed details for future proposed scale up of RCT

Trial activity	Specific area of concern highlighted in feasibility study	Proposed solution for scale up to trial
Recruitment	Low primary care recruitment number	Targeted recruitment through: (i) use of electronic health records data (ii) media including national/global key opinion leaders promoting testing e.g. Bollywood personality (iii) pathway finder to facilitating link between recruitment and primary care
	Participants mainly recruited from older age groups	(i) explore delivery in new venues e.g. youth clubs, community groups, antenatal clinics in high south Asian populations as a venue to improve engagement with women (ii) peer lead recruitment (iii) promote social networks (iv) media including national/global key opinion leaders promoting testing e.g. Bollywood personality
Results	Hard to follow up with participants after point of care testing	Undertake PPI to explore ways to simplify follow up: (i) via text messaging (ii) coordination via key link personnel through e.g. pathway finders supported by clinical commissioning groups. (iv) point of care testing results for hepatitis c RNA (v) one stop shop <i>fibroscan</i> – hepatic elastography
	Low rates of questionnaire completion	(i) simplify questionnaire (ii) real time onsite completion using tablet key pads